

**HOW TO SESSION: TECHNIQUES & PRACTICE**

# CARTO-Guided Atrial Fibrillation Ablation

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**KEY WORDS:** *Atrial Fibrillation;  
Ablation*

**ABBREVIATIONS**

3D = three-dimensional  
AF = atrial fibrillation  
PV = pulmonary vein

Atrial Fibrillation (AF) is associated with increased morbidity and mortality and a more severe impairment in quality of life compared with patients with congestive heart failure or myocardial infarction. Left atrial myocardial extensions, known as “myocardial sleeves”, are present in almost all pulmonary veins (PVs), and have been recognized as the main source of triggers that initiate and perpetuate AF.

In this setting, electrical isolation of the PVs have been accepted as the basis of AF catheter ablation. Three-dimensional (3D) heart geometry is an innovative technique facilitating the AF ablation procedure. After a single transseptal puncture, the 3D geometry of the left atrium is reconstructed using the CARTO 3 navigation system (Biosense Webster, Inc., Diamond Bar, CA, USA). Wide circumferential lesions for isolation of large atrial areas around both ipsilateral PVs (PV antral isolation) are applied using a 3.5-mm-tip ablation catheter. Circumferential ablation is performed on the posterior wall >1 cm and on the anterior wall >5 mm away from the defined PV ostia. The end point of ablation is the absence or dissociation of potentials in the isolated area as documented with the circular mapping (“lasso”) catheter. When PV conduction is still present following wide circumferential lesions around both ipsilateral veins, both PVs are mapped sequentially by the circular mapping catheter to localize the earliest PV potentials. Based on the earliest PV potentials recorded by the circular mapping catheter, RF energy is reapplied to close the conduction gap.

By using this method of AF ablation, in our patients with paroxysmal AF, we have succeeded a 70% sinus rhythm maintenance during a short and medium term follow up. In a recently published paper by our electrophysiology laboratory team (Europace 2014;16:202), 126 patients (78 males, median age 61 years) with symptomatic paroxysmal AF underwent left atrial ablation. Over 16 months (interquartile range: 10.8–26.0), 89 patients were recurrence-free (70.6%). Larger left atrial volume (P: 0.039), diabetes (P: 0.001), dyslipidemia (P: 0.003), coronary artery disease (P: 0.003), class III antiarrhythmic drugs (P: 0.017), CHADS2 (P: 0.006), and CHA2DS2-VASc (P: 0.016) scores were univariately associated with recurrence. In the multivariate analysis, both CHADS2 (hazard ratio: 1.91, 95% confidence interval 1.09–3.36, P: 0.023) and CHA2DS2-VASc (hazard ratio: 1.97, 95% confidence interval 1.16–3.33, P: 0.012) were independently associated with AF recurrence. Cut-off analysis showed that a score  $\geq 2$  for both the CHADS2 (sensitivity = 46% and specificity = 79%, area under the Receiver’s operating characteristic curve, AUC = 0.644) and CHA2DS2-VASc score (sensitivity = 57% and specificity = 65%, AUC = 0.627) showed the highest predictive value for AF recurrence.

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